

Nevada Test Site

Overview of the Nevada Test Site

February 2003

Introduction

The Nevada Test Site supports national security missions. The existing assets of the site represent a unique and indispensable extension of the national laboratories' experimental capabilities essential to the timely execution of operations and experiments in support of the Stockpile Stewardship Program. The test site is also an operational site for environmental restoration, low-level radioactive waste management, and ground water characterization activities. Non-defense research and development activities are conducted in cooperation with universities, industry, and other federal agencies.

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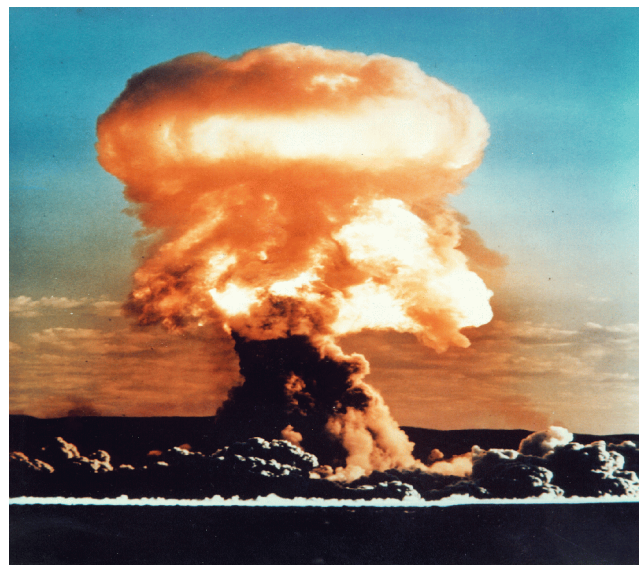
Early Days

The first documented report of people entering what we now know as the Nevada Test Site was in 1846 when a party of pioneers wandered through the area on their way to California. The second documented exploration of the region was in 1848 when these intrepid pioneers sought a shorter route between settlements in Nevada and California. However, reports from these explorers discouraged others from using the region as a travel route across the state. In 1905, a short lived mining bonanza began when, over a period of a few weeks, 1,500 prospectors moved to the area seeking fortunes in silver and gold. The boomtown of Wahmonie was born, but disappeared just as quickly when deposits ran out in 1929.

Search for a Continental Test Site

After the first test of a nuclear device at the Trinity Site in New Mexico, the United States moved its nuclear weapons experiment program to the Pacific. Five tests were conducted at Bikini and Enewetak atolls, but security and logistical issues quickly surfaced and the need for an

on-continent test site was realized. In 1947, a search, code named *Project Nutmeg*, was implemented to find a continental test site. On December 18, 1950, President Harry S. Truman authorized the establishment of a 680 square mile section of the Nellis Air Force Gunnery and Bombing Range as the Nevada Proving Grounds, a name it kept until 1955, when it became the Nevada Test Site.



Operation Plumbbob Owens test July 25, 1957 in Yucca Flat.

Atmospheric Testing

The first atmospheric nuclear test detonated at the Nevada Test Site was *Able* on January 27, 1951. When atmospheric testing ended at the Nevada Test Site in July 1962, 100 atmospheric tests had been conducted. On August 5, 1963, all atmospheric testing was banned when the Limited Test Ban treaty was signed in Moscow.

Peaceful Uses of Nuclear Energy

During the period July 1962 to July 1971, 23 tests involving 29 detonations were conducted at the Nevada Test Site as part of the Atomic Energy Commission's *Plowshare Program*. It was a research and



Sedan was the first plowshare test to be conducted at the Nevada Test Site.

development activity directed toward establishment of the technical and economic feasibility of using nuclear explosives in industry and science. The program was based on the premise that the tremendous energy available from nuclear explosions could be useful for a variety of peaceful purposes including earth excavation. It also included ditching and channeling, recovery of valuable mineral resources, and

stimulation of production of natural gas and other hydrocarbons.

Non-Explosive Nuclear Research

In 1959 the southwest portion of the test site was designated as the Nuclear Rocket Development Station. Twenty-six experimental tests of reactors, nuclear engines, ramjets, and nuclear furnaces were conducted between 1959 and 1973. In 1962, in the north central part of the site, *Operation BREN – the Bare Reactor Experiment-Nevada* – was conducted. This joint U.S./Japanese Atomic Bomb Casualty Commission study was to determine the approximate exposures experienced by the survivors of the Hiroshima and Nagasaki bombings. The tower contained an unshielded reactor on an outside elevator to determine dose on Japanese-type housing. Raising or lowering the elevator changed the angle and distance of the reactor's radiation that struck radiation-measuring equipment.

Nuclear Testing

The United States has conducted 804 underground and 100 atmospheric tests at the Nevada Test Site. An additional 24 joint U.S./United Kingdom tests were also performed. These 928 tests at the Nevada Test Site were done to study weapons effects, weapons related safety and reliability, and the peaceful use of atomic energy (Plowshare). The last underground test, *Divider*, was conducted on September 23, 1992.

Subcritical Experiments

Today, the U.S. Department of Energy's mission of maintaining the safety and reliability of the U.S. nuclear stockpile without nuclear testing is done with

subcritical experiments. They are called subcritical because there is no critical mass formed, that is, no self-sustaining nuclear chain reaction occurs. Chemical high explosives generate high pressures that are applied to nuclear weapon materials. Scientific data is obtained on the behavior of this material using complex, high speed measurement instruments. The experiments are conducted in the U1a Complex, an underground laboratory of horizontal tunnels at the base of a 962-foot vertical shaft in the central portion of the site.

Device Assembly Facility

This 100,000 square-foot facility was designed to consolidate all nuclear and conventional explosive assembly functions at the Nevada Test Site. The original purpose of the facility was to consolidate all nuclear explosive assembly operations and to provide a state-of-the-art safeguards and security environment. However, with an end to underground nuclear testing, the planned mission for the DAF changed. Today, DOE laboratory scientists use the facility to assemble subcritical experimental packages. In addition, the DAF would be where the United States would bring a damaged nuclear weapon for disposition.

Big Explosives Experimental Facility (BEEF)

The Big Explosives Experimental Facility plays a large role in accumulating data to support the Science Based Stockpile Stewardship program, along with a variety of new experimental programs, that will expand this nation's non-nuclear experiment capabilities. BEEF also complements the U1a complex and other DOE laboratory facilities. Initial experiments have furthered the development of methods for rendering a safe and improvised nuclear device. Scientists are also conducting primary weapons physics experiments, using high



Big Explosives Experimental Facility, showing the blast berm.

explosives and pulsed laser power, to study and investigate impacted materials as they are merged together by the detonations. Additionally, the programs will exercise the design and experiment skills resident in the primary development groups at the national laboratories required for the execution of future stewardship and management missions.



Hazardous Materials Spill Center

Aerial view of the HAZMAT Spill Center.

The Center is the only one of its kind in the free world for either large or small scale hazardous and toxic fluid testing under controlled conditions. It is ideally suited for sponsors to develop verified data on the

environmental effects of toxic and hazardous materials.

Buried Objects Detection Facility

This unique facility operated by Lawrence Livermore National Laboratory evaluates mine detection hardware. The facility is available to military and civilian research efforts for the detection and characterization of various buried objects. The facility covers 100 acres and contains 296 mines, 276 of which are available to experimenters to use for uniform calibration of their detection instruments. The characteristics of 20 mines are kept from experimenters and become the actual search objects.

Joint Actinide Shock Physics Experimental Research (JASPER) Facility

Work commenced in April 1999 to build a Two-Stage Light Gas Gun Facility at the Nevada Test Site. The first inert shot took place in March 2001. The purpose of this scientific instrument is to help researchers determine the properties of critical materials by shocking them with a small projectile traveling at hypervelocity.

Stockpile Stewardship

Through an active Stockpile Stewardship Program, the United States is ensuring the safety and reliability of the nuclear deterrent without nuclear testing. United States nuclear scientists are using the program to understand the fundamental physics and chemistry that govern a nuclear weapon's performance. By careful measurement of the materials that make up a nuclear weapon and by understanding how those materials interact and age, scientists will be able to predict changes in safety, reliability, and performance. To understand key aspects of weapons function, scientists are replicating the extreme temperatures and pressures in the laboratory and conducting

subcritical experiments at the Nevada Test Site to measure important dynamic material properties of plutonium and other materials.

Results from these experiments are then combined with computer simulations to detect and predict the unique changes that will occur in the aging stockpile.

Weapons of Mass Destruction/First Responder Training

Emergency personnel who respond to terrorist acts involving chemical, biological, radiological, and high explosive weapons get valuable hands-on training at the Nevada Test Site. Members from local, state, and federal agencies are able to interact with emergency personnel to establish standard operating procedures and develop decontamination procedures. The Nevada Test Site is an ideal location to conduct these training exercises due to the existing industrial environments and open areas to fully deploy forces. This training is conducted primarily at the Hazardous Materials Spill Center and other areas within Frenchman Flat where students can be subjected to surrogate chemicals, fires, explosions, and other realistic training scenarios.

Disposal Operations

In 1961, the Area 5 Radioactive Waste Management Site was established for the disposal of low-level radioactive waste from U.S. Department of Energy generators. The waste is generated by the downsizing and decommissioning of the country's nuclear weapons complex. The waste includes materials such as soil, construction debris, rubber gloves, and lab coats.

Ground Water Monitoring Program

In order to insure the safety of the public from radioactive contamination resulting from underground nuclear tests, the U.S. Department of Energy has continuously monitored water on and surrounding the test site. No radioactive contamination from the underground tests has been found in water samples taken from wells off the Nevada Test Site.

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